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ABSTRACT

Self-efficacy theory proposes that beliefs about behavior are important variables to consider in the study of behavior change. The belief that an individual is capable of executing behavior and that the execution of such behavior will result in the desired outcome must be present for behavioral and psychological change to occur. This theory may have useful implications for the behavioral or cognitive-behavioral treatment of obesity. Sixty women and nine men participated in a weight-control program. Subjects were randomly assigned to behaviorally oriented intervention conditions which either did or did not contain a cognitive component. The hypothesis that greater changes in eating self-efficacy would be evident in the intervention conditions which contained a cognitive intervention component was not supported, although the pattern of the means was indicative of an increased effect in the cognitive groups. The hypothesis that there would be a significant relationship between weight loss and eating self-efficacy was supported; stronger evidence was derived from number of pounds lost than from a weight reduction quotient. Eating self-efficacy was significantly positively correlated with measures of hopelessness, motivation, stimulus control, and negative thoughts about weight and was negatively correlated with behavioral techniques. (Author/ABL)

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The Effects of Behavioral and Cognitive-Behavioral Treatments on Eating Self-Efficacy

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Abstract

Self-efficacy theory proposes that beliefs about behavior are important variables to consider in the study of behavior change. The beliefs that one is capable of executing behavior and that the execution of such behavior will result in the desired outcome must be present for behavioral and psychological change to occur (Bandura, 1977). This theory may have useful implications for the behavioral or cognitive-behavioral treatment of obesity. Sixty women and nine men participated in a weight control program. Subjects were randomly assigned to behaviorally oriented intervention conditions which either contained a cognitive components or did not contain a cognitive component. Physiological, behavioral, and cognitive measures were collected at pretest, posttest, and at three- and six-month follow-up assessments. The hypothesis that eating self-efficacy would increase during treatment and remain increased at 3- and 6-month follow-ups was supported. The hypothesis that greater changes in eating self-efficacy would be evident in the intervention conditions which contain a cognitive intervention component was not supported, although the pattern of the means is indicative of an increased effect in the cognitive groups. The hypothesis that there would be a significant relationship between weight loss and eating self-efficacy was supported; stronger evidence is derived from number of pounds lost than from a weight reduction quotient. Patterns of the relationships between eating self-efficacy and weight-related cognitions and behaviors were as predicted; eating self-efficacy was significantly positively correlated with measures of hopelessness,

motivation, stimulus control, and negative thoughts about weight, and negatively correlated with behavioral techniques.

Self-efficacy theory proposes that beliefs about behavior are important variables to consider in the study of behavior change. The beliefs that one is capable of executing behavior and that the execution of such behavior will result in the desired outcome must be present for behavioral and psychological change to occur (Bandura, 1977). This theory provides a useful framework for understanding psychological and behavioral changes resulting from different therapeutic approaches because it provides a common explanatory mechanism, self-efficacy, through which people exercise influence over behavior. The individual's perception of their capabilities is a critical factor in understanding behavioral and psychological change. Self-efficacy, then, can be used to study changes that result from different treatments for the same clinical problem.

The application of self-efficacy theory to health and addictive behaviors has resulted in promising findings. In a comprehensive review of health-related behavior and self-efficacy, O'Leary (1985) suggested that although the specific treatment procedures may differ for treatment of various disorders, assessment and treatment of self-efficacy has substantial utility. Perceived self-efficacy may affect health behavior by influencing self-judgements, which influence choice to engage or avoid specific behaviors (O'Leary, 1985). There is sufficient evidence to demonstrate a significant relationship between self-efficacy and different health behaviors (e.g., smoking cessation, pain management, weight control, and compliance with medical regimens)

has been established (O'Leary, 1985).

Self-efficacy theory provides a model useful for understanding various problematic aspects of the current weight loss field. One problem concerns the extreme variability in response to treatment (Brownell, 1982; Wilson, 1978). Another concerns the lack of reliable predictors of success (Cook & Meyers, 1980; Weiss, 1977). There is evidence that self-efficacy may be a critical variable in accounting for weight loss (Bernier & Avard, 1986; Edell, Edington, Herd, O'Brien & Witkin, 1987; Glynn & Ruderman, 1986). Bernier and Avard (1986) found that pretreatment level of personal efficacy predicted weight loss during treatment, and posttreatment personal efficacy predicted weight loss at a 6-week follow-up, but not at a 6-month follow-up. Edell et al. (1987) reported that a significant percentage of the variance of actual weight lost was accounted for by self-efficacy and self motivation. Self-efficacy and weight loss were correlated; confidence (efficacy) correlated less positively than outcome expectancies to weight loss ($r=.16$, $p<.05$ and $r=.57$, $p< .01$). Confidence (efficacy) and outcome expectancies did not correlate significantly with each other, indicating that self-efficacy is best understood by these constructs separately rather than as a unitary construct.

The distinction between efficacy and outcome expectations has been made by Bandura (1977); efficacy refers to a judgement made by an individual regarding their own ability to complete a specific task. Outcome expectations refer to the belief that a change will result in a desired outcome. This difference was found by Bennett (1986), who reported that outcome expectations correlated .34 (p

<.001) with weight loss and efficacy expectations correlated .33 ($p < .05$) with weight loss.

The results of two studies which manipulated efficacy expectations also provide support for the relationship between weight loss and self-efficacy. Chambliss and Murray (1979) found that Rotter's locus of control orientation was related to weight loss response; a program designed to increase self-efficacy beliefs was successful with internal subjects, and the same program was unsuccessful with external subjects, who respond somewhat better to a program in which success is attributed to medication. Similar conclusions were reported by Weinberg, Hughes, Critelli, England, and Jackson (1984) who randomly assigned subjects high and low in preexisting self-efficacy to high or low manipulated self-efficacy groups in a 2 X 2 (preexisting self-efficacy X manipulated self-efficacy) factorial design.

The operationalization of eating self-efficacy was greatly improved with the development of the Eating Self-Efficacy Scale (ESES; Glynn & Ruderman, 1986) which has demonstrated good internal reliability, test-retest reliability, and convergent validity. The authors demonstrated that the ESES predicted subsequent weight loss and that increases in ESES were correlated with weight loss.

The present study was designed to further explore the relationships between eating self-efficacy, cognitive and behavioral change and weight loss. This research compares the effects of behavioral intervention alone with a behavior therapy plus cognitive therapy intervention on eating self-efficacy. Explicit attention to the identification and modification of maladaptive weight-related

cognitions may impact the sources of efficacy expectations more directly and intensely than the modification of only weight-related behaviors.

It was hypothesized that eating self-efficacy would increase during treatment and remain increased at three- and six-month follow-ups. Further, it was hypothesized that greater changes in eating self-efficacy would be evident in cognitive intervention conditions than non-cognitive conditions. Secondly, it was hypothesized that there would be a significant relationship between weight loss and eating self-efficacy. Third, relationships between eating self-efficacy and weight-related cognitions and behaviors were predicted to be correlated.

Method

Subjects

Subjects were recruited through announcements in the faculty/staff newsletter of a large state university, in the local newspaper, and on a public cable television station. Participants were required to weigh at least 15% more than the highest weight in the range for their height and body frame size according to the Metropolitan Height and Weight tables (Metropolitan Insurance Company, 1983) and to obtain written medical consent. The following exclusionary criteria were employed: 1) current treatment for obesity or past enrollment in other weight loss programs conducted by this researcher or colleagues, 2) demonstration of bulimic behavior, 3) current usage of any medication that would affect water retention, appetite or metabolism, and 4) pregnancy. In addition,

subjects were required to place a $50 deposit refundable contingent upon completion of homework assignments and attendance at follow-up assessments.

Sixty women and nine men participated in the study. The mean age of the subjects was 40.68. Pre-treatment mean weight was 185.37, the mean number of pounds overweight was 50.25, and subjects averaged 36.90 percent overweight.

Procedure

Subjects were blocked on gender and percentage overweight, and randomly assigned within stratified blocks to one of four interventions: behavior therapy plus cognitive therapy (BT + CT), behavior therapy plus nutrition education (BT + NE), and behavior therapy plus cognitive therapy and nutrition education (BT + CT + NE), and behavior therapy plus social support (BT). All treatment conditions contained behavioral intervention, which followed the program outlined by Ferguson (1975). Self-monitoring, stimulus control and contingency management are essential features of this behavioral package. The focus is on changing inappropriate eating patterns and habits. The cognitive component consisted of identification and modification of cognitions that affect weight loss. The nutritional intervention focused on meeting dietary requirements while maintaining a low calorie level. The social support component was designed to facilitate group members helping each other through information-sharing, problem-solving and support. Treatment sessions included private weekly weigh-in on a digital scale. Homework was required, checked weekly, and subjects were refunded a portion of the deposit for completing homework

assignments.

There were two groups in each intervention condition; each group consisted of 8 participants. Groups met for two hours a week for 10 weeks. For more information about the intervention conditions, please contact the first author.

Measures

A comprehensive assessment battery consisting of physiological, behavioral, and cognitive measures was administered pre-treatment, post-treatment, and at three- and six-month follow-up sessions.

Physiological Measures. Measurement of height to the nearest inch, weight to the nearest pound, and body frame size of each subject were obtained and compared to the standards of the Metropolitan Height and Weight tables (1983) to determine percentage overweight.

The Feinstein (1959) weight-reduction quotient (WRQ), was used in the analyses because it accounts for height, weight, degree overweight, weight-reduction goals, and number of pounds lost. This WRQ is calculated as follows:

$$WRQ = \frac{\text{Pounds lost}}{\text{Pounds Overweight}} * \frac{\text{Initial weight}}{\text{Ideal weight}} * 100$$

Behavioral Measures. Participants were given a self-report behavior questionnaire (BQ; DeLucia, 1988) to assess the frequency of specific eating behaviors, such as techniques used to slow eating and the use of alternative activities. Subjects were asked to rate the percentage of time each behavior was used (0 to 100%). A mean behavior technique usage percentage was calculated by summing the

rating of percentage of times used for each technique and dividing by the total number of techniques. High scores on the BQ indicate compliance with the behavioral treatment. Internal consistency of the BQ was .85 (Cronbach's alpha).

The Stimulus Control Scale from the Master Questionnaire (MQ; Straw et al., 1984) was used to assess the behavioral effects of the weight loss interventions. The items are presented as statements to which subjects are asked to respond by agreeing or disagreeing. Scores are computed by counting each agreement as one point and each disagreement as zero points. High scores on the stimulus control scale indicate that the individual eats in response to external, rather than internal, cues of hunger. Test-retest correlations for the stimulus control scale was .82 and internal consistency was .77 (Straw et al., 1984).

Cognitive Measures. The Eating Self-Efficacy Scale (ESES; Glynn & Ruderman, 1986) was included to assess the relationship between eating self-efficacy and weight control. Twenty-five items are presented to subjects who are asked to respond by rating the difficulty controlling their eating on a 1 (no difficulty controlling eating) to 7 (most difficulty controlling eating). Thus, high scores on the ESES indicate difficulty in controlling eating in a variety of situations and therefore, a low eating self-efficacy. Two subscales derived from factor analytic procedures are concerned with eating during socially acceptable circumstances (SAC) and when experiencing negative affect (NA). Internal consistency measures for the ESES were .92 for the entire measure, .94 for the NA subscale and .85 for the SAC subscale (Glynn & Ruderman, 1986).

Test-retest reliability over a 7-week period was .70 for the entire measure (Glynn & Ruderman, 1986).

The Hopelessness, Motivation and Physical Attribution Scales from the Master Questionnaire (MQ) were used to assess cognitive changes relating to weight loss. As described above, the items are presented as statements to which subjects are asked to respond by agreeing or disagreeing. Scores are computed by counting each agreement as one point and each disagreement as zero points. High scores on the cognitive scales indicate maladaptive ways of thinking about weight loss. Test-retest correlations for the hopelessness, motivation, and physical attribution subscales were .74 (Straw et al., 1984). Alpha coefficients were .79, .77, and .79 for the subscales, respectively (Straw et al., 1984).

The Negative Thoughts About Losing Weight (NTWQ) measure was designed to assess specific thoughts about losing weight (DeLucia, 1988). The items are presented as statements to which subjects are asked to respond on a scale of 0 (I never think this way) to 10 (I always think this way). Sample items are "I can't lose weight just by thinking about it" and "Food is the most important thing there is". High scores indicate the presence of negative cognitions about weight loss. The Alpha coefficient was .78 (DeLucia, 1988).

Results

Hypothesis 1: Eating Self-Efficacy: Time and Treatment Effects

Part 1: Time Effects. A repeated measures analysis of variance (ANOVA) with ESES scores as the dependent variable resulted

in a significant time main effect, $F(3,36) = 7.30$, $p < .0006$. ANOVAs containing the NA and SAC subscales of the ESES also resulted in significant time main effects: for NA, $F(3,36) = 4.91$, $p < .0058$ and for SAC, $F(3,36) = 6.56$, $p < .0012$ (see Table 1).

Decreases in ESES scores indicate increases in self-efficacy; self-efficacy increased from 114.67 at pre-test, to 101.50 at posttest, to 99.93 at 3-month follow-up, and 98.69 at 6-month follow-up. Changes in the NA and SAC subscales can be found in Table 1.

Thus, the hypothesis that eating self-efficacy would increase during treatment and remain increased at three- and six-month follow-ups was supported.

Part 2: Treatment Effects. A repeated measures ANOVA with treatment as the independent variable and ESES scores as the dependent variable resulted in nonsignificant effects for cognitive therapy, $F(4,35) = .64$, $p < .6344$. Similar findings were found for NA and SAC; $F(4,35) = .67$, $p < .6159$ and $F(4,35) = .47$, $p < .7605$ (see Table 1).

The pattern of the means for the CT and non-CT groups, however, do fall in the predicted direction. The ESES scores for CT groups were 115.79, 98.54, 97.80, and 92.89; the non-CT means were 111.56, 102.78, 100.77, and 100.28. Means for the NA and SAC subscales are presented graphically in Figure 1.

Thus, the hypothesis that the cognitive intervention would result in greater changes than the non-cognitive interventions was not supported.

Hypothesis 2: Eating self-efficacy and weight loss.

Pounds Lost. Correlational analyses indicate that ESES at posttest is correlated with pounds lost at posttest ($r = .36$, $p < .0058$), and with pounds lost at the three-month follow-ups ($r = .34$ $p < .0149$). ESES scores at three-month follow-up correlate significantly with pounds lost at the six-month follow-up ($r = .30$, $p < .0455$). ESES scores at six-month follow-up correlate significantly with pounds lost at the three- and six-month follow-ups ($r = .37$, $p < .0137$, $r = .31$, $p < .0438$).

Correlations between the NA and SAC subscales and pounds lost are presented in Table 2.

Weight Reduction Quotient (WRQ). Another set of correlational analyses was conducted using the Weight Reduction Quotient as a measure of change in weight. The patterns of significant correlations is similar to those described above; data is presented in Table 2.

Thus, the hypothesis that there would be a significant relationship between ESES and weight change was supported by this correlational analysis.

Hypothesis Three: Eating self-efficacy and weight-related cognitions and behaviors.

Cognitions. Correlational analyses were conducted to assess the relationships between the ESES and cognitive measures (MQ hopelessness, motivation, physical attribution, and the NTWQ) . The results indicate significant positive correlations between ESES at pretest, posttest, 3- and 6-month follow-ups and the hopelessness, motivation, and NTWQ scales. Pretreatment ESES correlated positively with MQ hopelessness and motivation scales at pretest,

posttest, and 3- and 6-month follow-ups, and with the NTWQ at pretest. Posttreatment ESES also correlated positively with MQ hopelessness and motivation and the NTWQ at all assessment periods. Similar patterns were found for the relationships between ESES at 3- and 6-month follow-ups and hopelessness, motivation, and NTWQ (see Table 3). The Physical Attribution (PA) scale resulted in only 3 significant correlations; the PA at the 6-month follow-up was positively correlated with ESES at posttest, and the 3- and 6-month follow-ups.

Behaviors. Correlational analyses were also conducted to assess the relationships between the ESES and behavioral measures (MQ stimulus control and BQ). The behavioral measures also correlated significantly with the ESES. The Stimulus Control scale was positively correlated with ESES while the BQ was negatively correlated with the ESES. Pretreatment ESES correlated positively with the MQ stimulus control at pretest, posttest and at 6-month follow-up and negatively with the BQ at pretest and the 6-month follow-up. Posttreatment ESES correlated positively with the MQ stimulus control at pretest, posttest, and the 3- and 6-month follow-ups, and negatively with the BQ at pretest, posttest and the 6-month follow-up (See Table 3).

Discussion

This study was designed to explore the role of eating self-efficacy in weight loss. It was predicted that eating self-efficacy would increase during treatment and remain increased at three- and six-month follow-ups; this hypothesis was supported. Further, it

was hypothesized that greater changes in eating self-efficacy would be evident in cognitive intervention conditions than in nutritional or social support conditions; this hypothesis was not supported. The data support the hypothesis that a significant relationship between weight loss and eating self-efficacy exists and that significant relationships between eating self-efficacy and weight-related cognitions and behaviors exist.

The change in ESES scores during the weight loss treatment and throughout follow-up assessments indicates that participation in a weight loss program increases efficacy about ability to control weight. Participants experience less difficulty controlling eating in a variety of situations. Relationships between ESES and measures of weight loss further support the usefulness of the self-efficacy concept in weight loss.

The correlational analyses provide important information about the relationships between eating self-efficacy and cognitive and behavioral changes. The cognitive results suggest that pre-treatment ESES was predictive of posttreatment and follow-up assessments of negative cognitions about weight control. High ESES scores are associated with high scores on the hopelessness and motivation scales and NTWQ. Since high ESES scores are indicative of difficulty controlling eating in a variety of settings, and high scores on the other cognitive scales are indicative of maladaptive cognitions, it seems that this information can be used to develop and implement treatment programs designed to target self-efficacy and these negative cognitions. Perhaps, individuals with high ESES scores are not ready to terminate weight control treatment.

As for the behavioral measures, high scores on the ESES were predictive of high scores on the stimulus control scale and of low scores on the BQ. High scores on the stimulus control scale are indicative of eating in response to external, rather than internal cues, and low scores on the BQ are indicative of low compliance with the behavioral techniques. Again, it seems that the ESES may be a useful tool for predicting problematic eating behaviors.

Table 1

Repeated Measures Analyses of Variance:
Eating Self-Efficacy Scale

Source	Degrees of Freedom	Wilks' F Value	Probability
CT	4,35	.64	.6344
NE	4,35	1.21	.3227
CT * NE	4,35	1.28	.2950
Time	3,36	7.30	.0006***
Time * CT	3,36	.86	.4685
Time * NE	3,36	1.35	.2732
Time * CT * NE	3,36	1.54	.2214

Repeated Measures Analyses of Variance:
Negative Affect (NA) Subscale

Source	Degrees of Freedom	Wilks' F Value	Probability
CT	4,35	.67	.6159
NE	4,35	1.37	.2651
CT * NE	4,35	1.65	.1841
Time	3,36	4.91	.0058**
Time * CT	3,36	.89	.4544
Time * NE	3,36	1.36	.2692
Time * CT * NE	3,36	1.92	.1437

Repeated Measures Analyses of Variance:
Socially Acceptable Circumstances (SAC) Subscale

Source	Degrees of Freedom	Wilks' F Value	Probability
CT	4,35	.47	.7605
NE	4,35	.61	.6555
CT * NE	4,35	.23	.9210
Time	3,36	6.56	.0012**
Time * CT	3,36	.60	.6184
Time * NE	3,36	.84	.4804
Time * CT * NE	3,36	.15	.9272

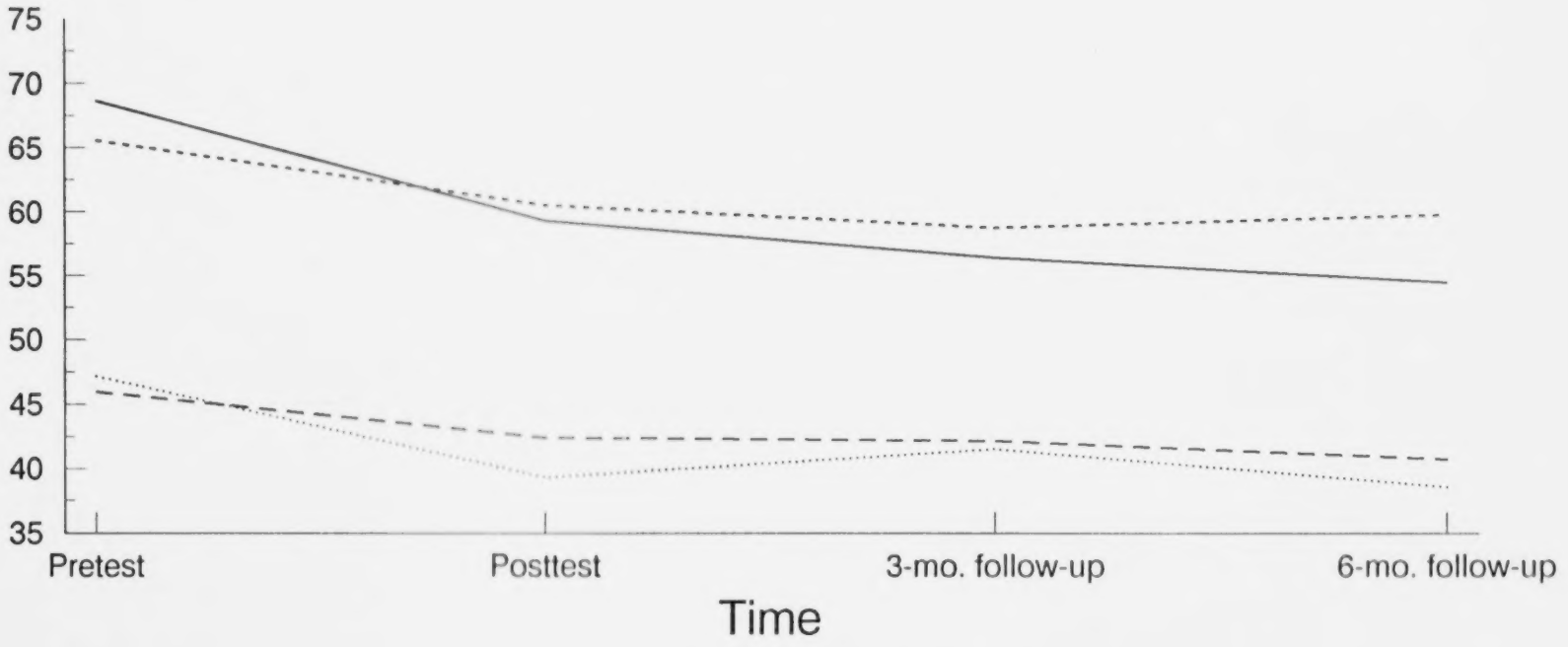
Eating Self-Efficacy Scale Means by Time

	Pretest	Posttest	3-Month Follow-up	6-Month Follow-up
ESES :	101.50	99.93	98.69	98.69
NA:	67.98	60.38	58.12	58.81
SAC:	46.69	41.12	41.81	39.88

Note: Level of significance:

p< .001 ***
p< .01 **

Eating Self-Efficacy
NA and SAC Subscales



From the Eating Self-Efficacy Scale

Table 2

Correlations Between Eating Self-Efficacy and Measures of Weight Change:

		Pretest	Posttest	3-Month Follow-up	6-Month Follow-up
Total ESES Scores:					
Pounds Lost	2	+.13	+.36**	+.06	+.19
	3	+.07	+.34*	+.26	+.37**
	4	+.17	+.27	+.30*	+.31*
WRQ	2	+.13	+.27*	+.03	+.18
	3	+.08	+.24	+.19	+.32*
	4	+.13	+.21	+.22	+.28
NA Scores:					
Pounds Lost	2	+.08	+.29*	-.02	+.09
	3	-.09	+.27	+.16	+.27
	4	+.15	+.27	+.22	+.16
WRQ	2	+.07	+.20	-.02	+.07
	3	+.02	+.19	+.13	+.22
	4	+.11	+.22	+.17	+.16
SAC Scores:					
Pounds Lost	2	+.17	+.30*	+.21	+.35*
	3	+.20	+.28*	+.33*	+.43**
	4	+.12	+.12	+.34*	+.51***
WRQ	2	+.19	+.27*	+.14	+.34*
	3	+.19	+.20	+.23	+.39**
	4	+.10	+.06	+.23	+.43**

Key:
WRQ = Weight Reduction Quotient

Note: Level of significance:

p< .001 ***
p< .01 **
p< .05 *

Table 3

Correlations Between Eating Self-Efficacy Scale and Cognitive and Behavioral Measures

		Pretest	Posttest	3-Month Follow-up	6-Month Follow-up
			Cognitive Measures		
MQHOP	1	+.39**	+.51***	+.49***	+.43**
	2	+.33*	+.49***	+.61***	+.59***
	3	+.41**	+.54***	+.60***	+.56***
	4	+.37*	+.49***	+.53***	+.60***
MQMOT	1	+.30*	+.27*	+.37**	+.41**
	2	+.28*	+.48***	+.56***	+.51***
	3	+.31*	+.47***	+.55***	+.58***
	4	+.55***	+.62***	+.67***	+.69***
NTWQ	1	+.36**	+.35**	+.40**	+.33*
	2	+.20	+.27*	+.22	+.19
	3	+.18	+.25	+.41**	+.29
	4	+.27	+.41**	+.35*	+.41**
			Behavioral Measures		
MQSC	1	+.27*	+.30*	+.48***	+.34*
	2	+.27*	+.55***	+.53***	+.58***
	3	+.15	+.45***	+.57***	+.54***
	4	+.33*	+.54***	+.34***	+.60***
BQ	1	-.47***	-.46***	-.26	-.29
	2	-.15	-.30*	-.41**	-.38*
	3	-.19	-.23	-.39**	-.31*
	4	-.53***	-.44**	-.54***	-.67***

Key:
MQHOP - Hopelessness Scale of the Master Questionnaire
MQMOT - Motivation Scale of the Master Questionnaire
NTWQ - Negative Thoughts about Weight Questionnaire
MQSC - Stimulus Control Scale of the Master Questionnaire
BQ - Self-report behavioral questionnaire

Note: Level of significance:

p< .001 ***
p< .01 **
p< .05 *

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